

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(Chapter II of the Patent Cooperation Treaty)

Applicant's or Agent's file reference	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/EP 03/51014	International filing date (<i>day/month/year</i>) 15.12.2003	Priority date (<i>day/month/year</i>) 31.12.2002
International Patent Classification (IPC) or national classification and IPC H03B5/18		
Applicant THALES et al		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 5 sheets including this title page.
3. This report is also accompanied by ANNEXES, comprising:
 - a. ☐ (*sent to the applicant and to the International Bureau*) a total of 5 sheets, as follows:
 - ☐ sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of Administrative Instructions).
 - ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
 - b. ☐ (*sent to the International Bureau only*) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:
 - ☒ Box No. I Basis of the report
 - ☐ Box No. II Priority
 - ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
 - ☐ Box No. IV Lack of unity of invention
 - ☒ Box No. V Reasoned statement according to Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
 - ☐ Box No. VI Certain documents cited
 - ☐ Box No. VII Certain defects in the international application
 - ☐ Box No. VIII Certain observations on the international application

Date of submission of the demand 14.07.2004	Date of completion of this report 11.03.2005
Name and mailing address of the IPEA <div style="display: flex; align-items: center;"> <div> European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Netherlands Tel. +31 70 340-2040 Tx: 31 651 epo nl Fax: +31 70 340-3016 </div> </div>	Authorized officer: Beasley-Suffolk, D Telephone No. +31 70 340-4251 <div style="text-align: right;"> </div>

INTERNATIONAL PRELIMINARY
EXAMINATION REPORTJC20 Rec'd PCT/PTO 29 JUN 2005
International application No. PCT/EP 03/51014

Box No. I. Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ This report is based on translations from the original language into the following language , which is the language of a translation furnished for the purposes of:
- ☐ international search (under Rules 12.3 and 23.1(b)).
 - ☐ publication of the international application (under Rule 12.4).
 - ☐ international preliminary examination (under Rule 55.2 and/or 55.3).
2. With regard to the **elements** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation according to Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

Description, pages

1-10 as originally filed

Claims, No.

1-5 as originally filed

Drawings, sheets

1/3-3/3 as originally filed

☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:
- ☐ the description, pages
 - ☐ the claims, Nos.
 - ☐ the drawings, sheets/fig
 - ☐ the sequence listing (*specify*):
 - ☐ any table(s) related to sequence listing (*specify*):
4. ☐ This report has been as been established as if (some of) the amendments annexed to this report and listed below has not been made, since they have been considered to go beyond the disclosure as filed, as is indicated in the Supplemental Box (Rule 70.2(c)):
- ☐ the description, pages
 - ☐ the claims, Nos.
 - ☐ the drawings, sheets/fig
 - ☐ the sequence listing (*specify*):
 - ☐ any table(s) related to sequence listing (*specify*):

* If item 4 applied, some or all of those sheets may be marked "superseded."

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/EP 03/51014

**Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or
industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty	Yes:	Claims	1-5
	No:	Claims	
Inventive Step	Yes:	Claims	1-5
	No:	Claims	
Industrial Applicability	Yes:	Claims	1-5
	No:	Claims	

2. Citations and explanations

see separate sheet

In the matter of point V

**Reasoned statement as regards novelty, inventive step and industrial applicability;
citations and explanations in support of this statement**

Reference is made to the following documents:

- D1: SHEN Z-Y ET AL: "High T_c superconductor-sapphire microwave resonator with extremely high Q-values up to 90 K" MICROWAVE SYMPOSIUM DIGEST 1992., IEEE MTT-S INTERNATIONAL ALBUQUERQUE NM, USA 1-5 JUNE 1992, NEW YORK, NY, USA, IEEE, US, June 1, 1992 (1992-06-01), pages 193-196, XP010062882 ISBN: 0-7803-0611-2
- D2: US-A-5 909 160 (DICK G JOHN ET AL) June 1, 1999 (1999-06-01)

1. Document D1, which is regarded as the closest prior art to the subject matter of claim 1, describes (the references in brackets apply to that document, in particular figure 1):
a microwave oscillator of very high stability, comprising a one-piece dielectric resonator in the form of a right cylinder frustum (sapphire rod), the resonator being placed in a cryogenic chamber (copper case) and being connected to an amplifier via optimized couplings (In, Out).

Consequently, the subject matter of claim 1 differs from this known oscillator in that: the one-piece dielectric resonator is in the form of a cylinder frustum hollowed out at mid-height along chords of its cross section.

The subject matter of claim 1 is therefore novel (Article 33(2) PCT).

2. The problem that the present invention aims to solve may therefore be considered as how to directly generate frequencies of several GHz using oscillators with electromagnetic resonators, while avoiding the problem of generating noise due to the limited quality factor of these resonators.

The solution to this problem proposed in claim 1 of the present application is considered to involve an inventive step (Article 33(3) PCT) for the following reasons: the drillholes in the resonator, and at least the faces of the resonator that are covered with a superconducting material, serve to reduce the sensitivity of the oscillator to vibrations and thermal fluctuations, and therefore serve to reduce the phase noise.

3. Claims 2 to 5 depend on claim 1 and therefore also satisfy, as such, the conditions required by the PCT as regards novelty and inventive step.
4. Contrary to what Rule 5.1 a) ii) PCT requires, the description does not indicate the relevant prior art presented in documents D1 and D2, nor does it cite these documents.
5. Claim 1 is drafted in two parts. However, the features of the cryogenic chamber, and the external couplings ought not to appear in the characterizing part, given that they are disclosed in document D1, in combination with the features mentioned in the preamble (Rule 6.3 b) PCT).